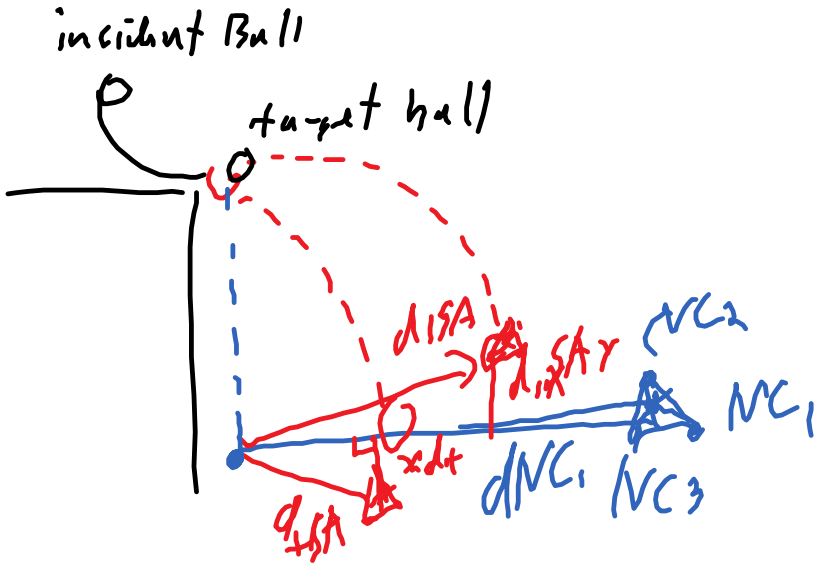
2d - Collision Lab investigation 2 method 1

purpose: determine if momentum and kinetic energy are conserved in collisions at different angles.
Hypothesis:
The vector sum of momenta of a system is conserved through collisions and explosions if the system is closed and isolated (no external forces)

Kinetic energy is conserved in perfectly elastic collisions - no energy goes into heat (friction), sound, deformation.

procedure refer to physics 12 lab manual Investigation 2 method 1

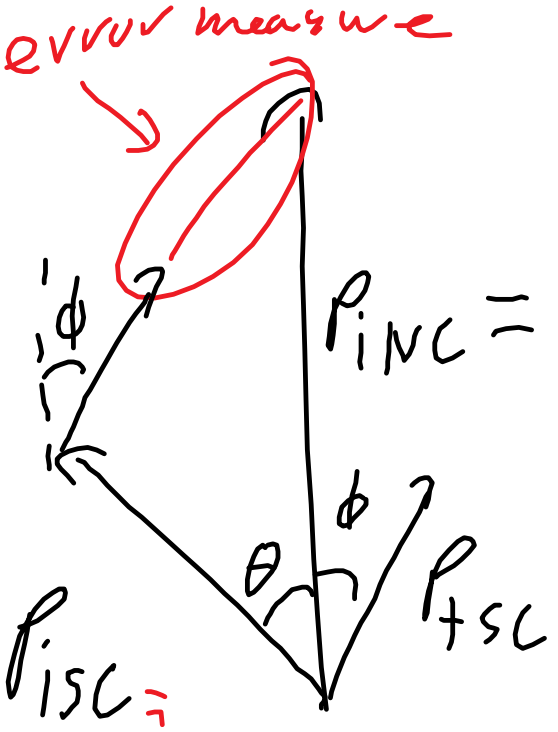


Observations:
groups of 2 or 3 hand in paper you tape to the ground with dots labelled.

3 drops 3 times (skip part of the lab)
1 set of 3 drops - no collision, incident ball. mass of incident ball_____
d of centroid of 3 dots to plumb line_____
2nd set of 3 drops - collision with small angle
mass of target ball_____
d to incident ball _____ x component_____
d to target ball_____ x component_____
3rd set of 3 drops - collision with larger angle
d to incident ball _____ x component_____
d to target ball_____ x component_____
Height of the collision point, h_____
Calculations:
p=mv=md/t h=1/2 gt^2 t = root(2h/g)
Angle = $\sin^{-1}$ (x component/d)
2 scale vector diagrams 1-small angle vs no collision 2 - larger angle vs no collision
Calculate vector components and compare to diagram error
Calculate total kinetic energies before and after
Conclusion
Sources of uncertainty/error
Show calculations of solving p26-28 in lab manual
Practice problems 1, 5, 9, 11

Sample data
p=md/t t= root (2h/g)
p=16.32g 0.515m/(root (2x0.765m/9.80m/s^2))
21.27 gm/s

Scale 1cm = 1 g m/s



Components.

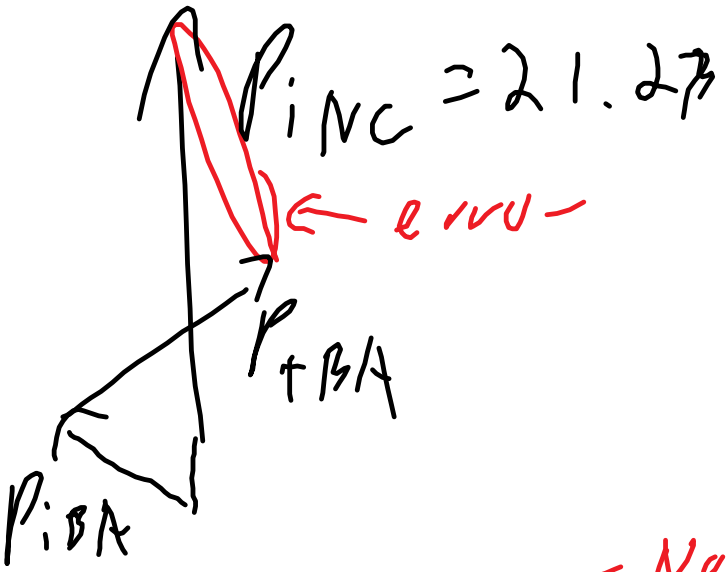
$\Sigma p_{x_i} = \Sigma p_{x_f}$

$\Sigma p_{y_i} = \Sigma p_f$

error total

$\sqrt{p_x^2 + p_y^2}$

flip page



← No Angle)

$$E_K = \frac{1}{2} m v^2 = \frac{1}{2} m \frac{d^2}{a}$$

Not a vector

J